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GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

Relics of Arctic Expeditions Deposited with the British Admiralty and the Royal Geographical Society. The Crocker Land Expedition of 1913-1917 brought back to this country an exceedingly interesting collection of relics and souvenirs of earlier Arctic expeditions. As one of the three institutions that supported the Crocker Land Expedition the Society received the geographical portion of this collection. Thereupon the Council of the Society, recognizing the interest of the British people in those relics and objects which related to British expeditions, offered the larger part of the collection to the British Admiralty. Through the good offices of the British Ambassador at Washington and the British Consul-General at New York the collection was recently forwarded to London for appropriate distribution. Some of the more interesting items were described in "Notes on MacMillan's Ellesmere Island Trip" in the *Geographical Review*, March, 1918. A number of the articles that were connected rather directly with the past history of that institution were offered to the Royal Geographical Society at London for exhibition in their Museum. The objects retained by the British Admiralty are now in the Royal Naval College at Greenwich. Among those retained by the American Geographical Society are three records of the Peary Expedition of 1906 and a record of Dr. Kane's Expedition of 1903.

NORTH AMERICA

The Reform of Political Divisions on a Geographical Basis. Among the different political divisions in the United States none is more unscientific and ungeographical than the congressional district, particularly in the form given to it in the frequent re-adjustment of its bounds for partisan ends. In the *American Political Science Review* (Vol. 12, 1918, No. 3, pp. 403-426), C. O. Sauer discusses these political units under the title "Geography and the Gerrymander." He shows how utterly congressional districts depart from being true natural or geographic units, and attempts to indicate how they could be reconstituted with due regard for geographic factors. The states of Missouri, Kentucky, and Tennessee are cited, illustrating faulty, unscientific grouping of electoral districts. In these states, according to the author, distinctly marked geographical regions have been totally disregarded in the creation of their congressional divisions.

The geographic factors which the author would take into account in the determination of "natural areas" are location, topography, soil, drainage, and mineral resources. Climate, too, would merit consideration in districts, such as the extreme west of the United States, where sharply contrasted types appear within a limited area. A geographical unit would be "one in which conditions of life are in general similar, because of similarity of environment."

That this is the natural basis for regional division in a more or less primitive condition of society will be readily admitted. But that the same principle applies in an advanced culture, based upon interchange of commodities, is not so certain. Much of the Ozark country clearly forms a distinct independent district, where similarity of environment makes for community of interests. But this is not so true of other sections of the state where the economic relationships established by an interchange of unlike productions of dissimilar environment forms the strongest bond of union; where unity depends upon diversity rather than similarity of geographical conditions. This latter principle of classification, strongly advocated by the French geographers (led by Vidal de la Blache) in their discussion of the regional divisions of France, would seem to be as truly geographic and better suited as a basis upon which to reconstitute the recognizedly unscientific electoral units established by the gerrymander.

EUROPE

The Northern River Boundary of Yugo-Slavia. On this topic an interesting brochure has recently been published by Jovan Cvijic (*Frontière septentrionale des Yougoslaves*, Paris, 1919). Because it was prepared in support of the Yugo-Slav claims at the Peace Conference of Paris, the analysis cannot be accepted as a definitive scientific statement, though the first part of the paper contains important geographical data. The second part also includes a section of special geographical interest dealing as it does with the problem of rivers as boundaries. The area dealt with is the Pannonian Plain where the Drave and the Danube meet. Both streams have meandering courses which are shifting toward the right. The consequence is that the thalweg of each stream is progressively dis-

placed. Were it taken as an international boundary line, each change in the river would alter the frontier. The alternative is to fix upon a given location of the thalweg as definitive and monument it for all time.

For example, following the actual displacement of the Danube in past years the administrative frontier between the Bačka and the Baranya did not correspond with the course of the stream but with the channels of certain abandoned meanders. In the case of the Drave many minor changes of the same sort have occurred, but the principal one is the district of the so-called "Island of Repaš" (commune de Gola). Reference to the accompanying figure will show that the river once had a more northerly course which has been shifted to its present one, leaving the old course as an insignificant drainage line. The administrative boundary was fixed at a time when the river took the more northerly course; and it has been maintained in that position ever since. Farther down stream the old course of the river has also remained the administrative frontier in spite of the shifting of the stream to a more southerly position.

Such displacements of the thalweg involve endless disputes which would have to be settled by later agreements and surveys. For example, there is the case of the Drina, which, according to the Congress of Berlin (1878), became the frontier between Serbia and Austria-Hungary, thus giving rise to a dispute before a mixed commission. Almost as soon as the commission's findings were announced new displacements in the course of the river gave rise to new negotiations.

By the terms of the treaty of peace with Hungary the boundary between Hungary and Yugo-Slavia is established on the old and well-monumented administrative boundary that at one time followed the earlier course of the Drave. This puts a larger number of Yugo-Slavs in the Serb-Croat-Slovene Kingdom than would be the case if the present course of the Drave were followed. At the same time it leaves the advantages of river control equally in both hands, because each power controls both banks of the river at a number of points.

Spanish Meteorological Service and its Publications. In the field of meteorology, in its international aspects, there has been a serious dearth of available material from Spain. The lack has been felt particularly in attempts to correlate data regarding the movements of extra tropical cyclones, many of which cross the Iberian peninsula. Though observations had been made during many years, because of an unsatisfactory organization of the service the results had been inadequate and the data collected had appeared in different publications, partly in the *Anuario Estadístico de España* (1858-1864), partly in the *Resúmenes de Observaciones Efectuadas en España*, issued by the Astronomical and Meteorological Observatory of Madrid (1865-1900).

In 1906 the entire meteorological service was entrusted to the Instituto Central de Meteorología, (since 1911 called the Observatorio Central Meteorológico) which forms one of the departments of the Instituto Geográfico y Estadístico. A marked improvement resulted. That office is now issuing in consecutive form the data collected during many years by the different organizations, official and cooperating. These appear in the *Resumen de las Observaciones Meteorológicas* of which volumes 5 to 12, covering the years 1901 to 1916, have recently been issued; and in the *Anuario del Observatorio Central Meteorológico* which, with its *Suplemento* contains also various studies of meteorological and climatic conditions in Spain. These studies cover such subjects as *Tormentas* (thunder-storms). Cyclones and Anticyclones, Rain Zones, Early Frosts, Aerology, etc. The usual maps are employed to show atmospheric pressure, temperature, rainfall and the paths of storms. In addition to reports of stations maintained on the peninsula, data from four points along the north coast of Africa and from the Canary Islands are included. On the island of Tenerife, where formerly existed the international aerological station, there is now established a similar Spanish observatory, which, besides the usual meteorological observations, records solar radiation and conducts investigations of upper air conditions. This observatory is situated 7,740 feet above sea-level near the base of Mount Teide. The results of the observations made there are published in the *Suplemento* to which reference has already been made (see *Anuario del Observatorio Central Meteorológico* Vol. I, (1916) and José Galbis y Rodríguez, *Estado Actual de Nuestra Organización Meteorológica; Ibérica*, Jan. 18. 1919, pp. 40-44.)

AFRICA

An Over-populated Island. In an extraordinarily limited environment the natives of Bukara (Ukara) Island in the southeastern corner of Lake Victoria Nyanza, have multiplied until today they number 19,000 on an area of only 36 square miles, and much of that is bare granite. There is "hardly a tree of respectable size to be seen anywhere." The climate is hot and stormy and marked by heavy rainfall which works havoc with the exposed fields. Faced by social and physical problems of the most trying kind, and isolated from the rest of the world, the natives have developed great ingenuity in solving the problem of survival

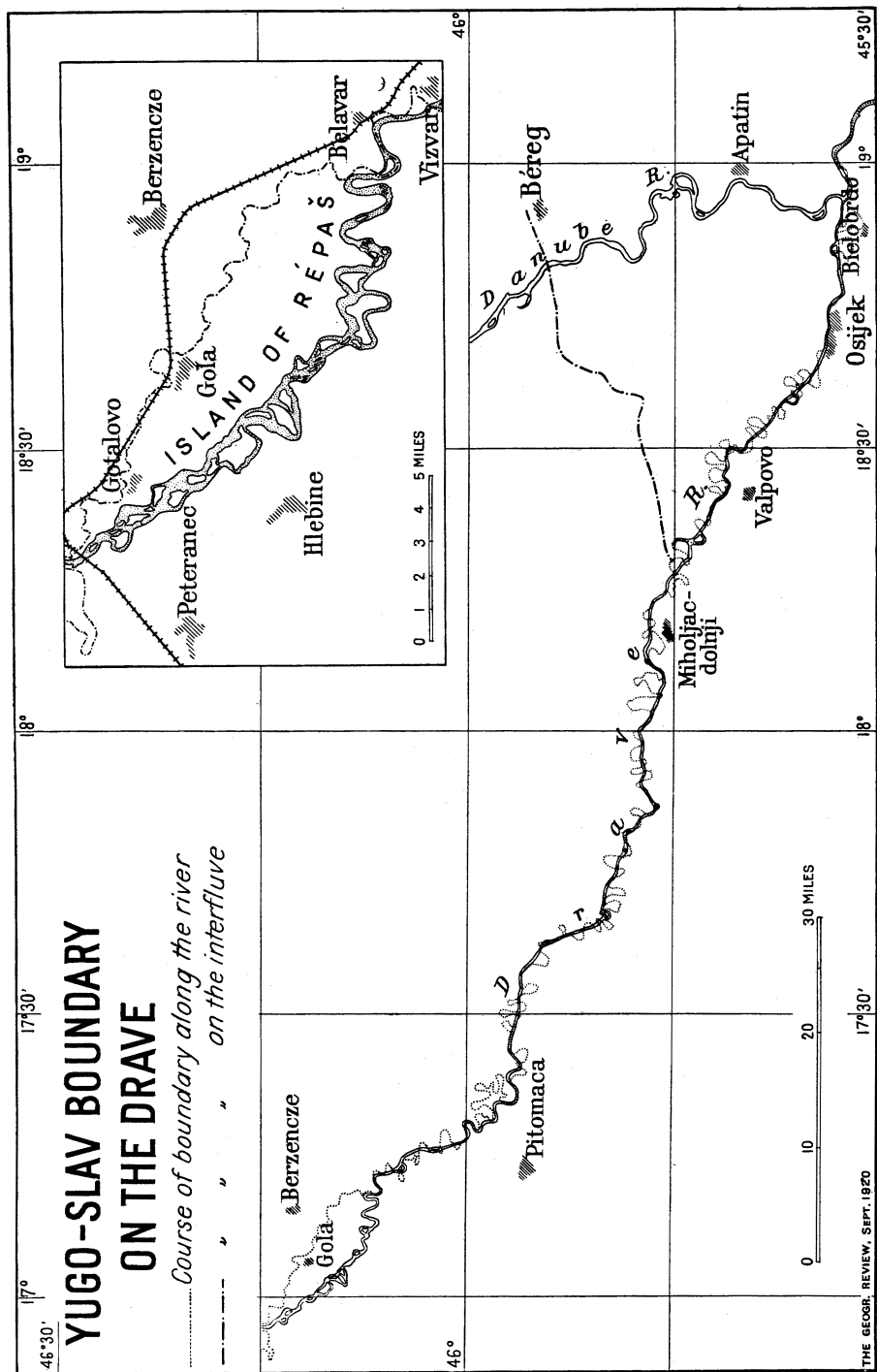


FIG. 1.—North of the Drave is Hungary; south of it is the "Kingdom of the Serbs, Croats and Slovenes," or Yugo-Slavia. Where the common boundary of these two states lies close to the river it is represented by a dotted line in order to show detail more clearly. Between the Drave and the Danube the boundary is represented by a dot-and-dash line. The inset shows details of river and boundary at the Island of Répaš where the former course of the Drave, now an almost dry channel, is represented by a dot-and-dash line. The inset also shows the complicated relations of the new boundary and the railway at Gola. The scale of the main map is 1:1,000,000.

in a state of over-population (H. L. Duke, Bukara Island, *The Cornhill Magazine*, June, 1920, pp. 705-710).

Economy has been carried to the point where every fertile area is used for village sites, gardens, or grazing-grounds. Each garden plot has an extent of 80 to 100 yards by 30 to 40 yards and is marked off by granite boundary stones, trees, or bushes. Rights of ownership are rigidly observed. As in the case of the native holdings of parts of the Anglo-Egyptian Sudan, the trees are valued more than the land on which they grow. One man may own the trees and another the ground: "a tree, if properly exploited, is a priceless possession." A man must not even steal his neighbor's leaves nor his sticks nor his rubbish! A father may even divide a tree among his children apportioning certain branches to each. There is the utmost economy in the use of the soil and the collection of fertilizer for it.

In addition to small individual holdings of grassplots for pasture there are communal holdings by villages. Mature grass is carefully husbanded for thatching, never burnt as among so many natives elsewhere. "It belongs to the chief, who doles it out to his subjects as required."

Artificial stone and earth embankments check the loss of the soil. A deposit of clay is worked for pipes and cooking pots but some clay has also to be imported from the mainland fifteen miles away. The steep-roofed huts are divided into two compartments, one for the native, the other for his cattle. Food is ground on flat rock surfaces, not in mortars. Twins and triplets are killed though the white man's coming will doubtless change this custom. It would seem that the limit of population capacity has been reached on Bukara and that emigration to the mainland must follow in the years to come.

A Recent Study of the Rift Valleys of Africa. Among the major relief features of the earth the African Rift Valleys are certainly one of the most interesting. Treated by one who has known them intimately for many years and who has recently extended his field observations they are seen to be as important in systematic physiography as they are attractive scenically (J. W. Gregory, *The African Rift Valleys*, *Geogr. Journ.*, Vol. 56, 1920, pp. 13-47).

After a spirited and clear description of their physical features and their extraordinary extent from Palestine to South Africa (illustrated with photographs and topographic sections) the author comes to the explanatory portion of his theme and here there is much to criticise. Almost nowhere does one obtain actual data respecting the evidence of the structural faults. There is always an obvious assumption that steep rock walls disposed in linear fashion, and often in opposition, on either side of a broad valley of flat or gently rolling relief, must mean faulting. No geologic sections are given, only the ground plan and topographic profiles. This is all the more surprising in view of the fact that much geologic evidence is supplied concerning the age of significant deposits and the character of the rock in an attempt to determine the sequences of topographic development.

The author's use of theory is startling and reaches its climax in the last paragraph where the difference in character of the American and African earth movements is explained by their antipodal relation. "Africa was antipodal to the Pacific, and it is in accordance with the well-known antipodal relation of ocean to continent that while the Pacific was sinking and the crust beneath it undergoing compression, its antipodal land should be rising and subject to tension." The uncritical nature of the statement is hidden from the layman by a beguiling assurance and plausibility of statement which is almost an integral part of the author's style. In the statement "Nor is there anything in America to correspond with the long tension rent of the Great Rift Valley" the author apparently overlooks the claims of the Rocky Mountain trenches of which the principal one extends in an almost straight line for 900 miles (R. A. Daly: *The Nomenclature of the North American Cordillera between the 47th and 53d Parallels of Latitude*, *Geogr. Journ.*, Vol. 27, 1906, pp. 586-606). While the rifts of the basin-range country of Nevada do not have the extent of the narrow and elongated rift valleys of Africa there is a correspondence of structure and process, and locally of relief, if the foundered structural arches and youthful fault scraps be considered.

AUSTRALIA

A Special Form of Sub-surface Drainage in Australia. There is a fairly wide distribution of certain features of minor drainage in Western Australia that appear to have considerable physiographic significance, according to a recent account published by M. Aurousseau (*Proc. Linnæan Soc., New South Wales*, 1919, pp. 826-827). In the region in which it occurs—on the flanks of the Darling Range—the slopes are soil-covered, and the forms are developed in the piedmont deposits on the margin of the slopes. There occurs a series of small holes of different sizes up to a foot in diameter and three feet deep, spaced irregularly along definite lines. These holes also occur on the steeper soil-clad slopes. Their walls are steep. The sub-surface channels with which they are related have no relation to contour. It appears that the sub-surface drainage is formed in fissures in the sub-soil that

develop in the hot dry summer and into which the heavy winter rains sink. The water flows along the fissures which then become widened into definite underground channels, with slumping from above thus bringing about surface pits and depressions. It appears that apart from its physiographic effects the matter has importance in diverting a larger part of the rainfall to underground reservoirs than would otherwise be the case.

PHYSICAL GEOGRAPHY

The Evolution of Climate. Climatic studies in recent years have furnished a meeting ground for geographers and geologists perhaps more extensive than any that has been supplied outside of the technical study of land forms and their dates of origin. A recent contribution to the subject deserves special notice because of its critical quality and the nature of its conclusions (*Evolution of Geologic Climates*, by F. H. Knowlton, *Bull. Geol. Soc. Amer.*, Vol. 30, 1919, pp. 499-565). It would require too much space to review in detail the successive arguments of the author. He has analyzed the subject principally from the standpoint of paleobotanical evidence. He then turns to the consideration of the atmosphere, sources of heat both within and without the earth, the effect of ocean temperatures, and the convergence of these factors, at least in part, upon the character of plant life. It is the latter part of the paper that lies more particularly in the geographical field, since it relates to the shifting of the position of the poles, changes in atmospheric and deep sea circulations, the effect of volcanic dust, etc.

The conclusion of the author is that the non-zonal climates of the past, and particularly the conditions of polar geniality of climate and tropical or subtropical glaciation, prove fatal to the hypothesis of solar control. He believes that the sun was not the dominant factor in maintaining temperatures on the earth during recorded geologic times. In his view it is the earth itself that has supplied the greater amount of heat that went into the disturbance or modification of the solar régime. He leaves untouched the question of the source of the heat, whether in the form of original earth heat or some augmented form of radioactivity, or a combination of these two.

Solar Variations and the Weather. Meteorologists are viewing with considerable interest the establishment of a new solar constant station in the Harqua Hala Mountains of Arizona and the removal of the Calama station, Chile, to a nearby mountain peak. The former will probably be in operation by October, 1920. Since 1912, when nearly simultaneous determinations of the solar constant of radiation at Bassour, Algeria, and at Mount Wilson, California (Smithsonian Astrophysical Observatory), seemed to show synchronous variations in the intensity of sunlight reaching the outer limits of the atmosphere, there has been until recently an unquestioning acceptance of Dr. C. G. Abbot's theory of short-period variations in the solar output of heat that reaches the earth. Determinations made day after day during several summers at Mount Wilson and, since July, 1918, throughout the year at Calama, Chile, have showed variations which in the course of a few days amount to 5 or even 10 per cent. Meteorologists began to look for earth effects, and Mr. H. H. Clayton showed that small variations in temperature and indirectly, therefore, in pressure occurred a few days following the variations in the determined values of the solar constant (see abstract in *Geogr. Rev.*, Vol. 5, 1918, p. 244). Encouraged by his results, Mr. Clayton subjected the solar constant data and subsequent weather in Argentina to a more rigid mathematical comparison, and published an interesting paper (*Smithsonian Misc. Colls.*, Vol. 71, No. 3, 1920), the most important point of which was, that the temperature at Buenos Aires reached well defined maxima about $3\frac{1}{2}$ days after high values of the solar constant as determined at Calama.

At this juncture, Professor C. F. Marvin made a thorough statistical analysis of the 1,500 determinations of the solar constant by the Smithsonian Astrophysical Observatory, and published a short note in the *Monthly Weather Review* summarizing his findings (Mar., 1920, Vol. 48, pp. 149-150). These determined values must include not only the variations of the sun, but also the small observational errors and those due to changes in atmospheric transmission during the course of the series of observations made for each determination of the solar constant with the bolometer (an instrument which measures the heat value of different parts of the solar spectrum). As instrumentation has become more accurate, the apparent variability of the solar constant has become less. Also, a recently introduced, short-cut, empirical method for getting the solar constant, from essentially one observation with a pyranometer, seems largely to have eliminated the errors due to changing atmospheric transmission, with the result that the variations in the solar constant as determined by it, are appreciably smaller than those obtained with the bolometer. Even if the instrumental and observational errors are set at a very small figure, it seems that solar variations must be very small.

But forecasters at Buenos Aires and, as I have been told, at Rio de Janeiro, are using the Calama data, received daily by telegraph, to forecast temperature. The $3\frac{1}{2}$ -day interval

between high values at Calama and high temperatures at Buenos Aires becomes a 5-day interval at Rio. It is possible, though it seems unlikely, that the variations in the solar constant as determined at Calama and in the temperatures farther east are due to atmospheric changes that reach Calama first. But how else than by the interception of sunlight by travelling clouds of electrons can the marked drop (about 7 per cent) in the solar constant observed at the time of the great aurora on March 22, 1920 (C. G. Abbot, *Monthly Weather Review*, April, 1920, Vol 48, pp. 227-228, Washington, April 28, 1920) be explained?

If the sun does vary appreciably, the simultaneous determinations of the solar constant in Arizona and in Chile will show synchronous changes. If it does not, the establishment of additional solar constant stations may prove necessary to discover what variations there are. The Weather Bureau is now embarking on a thorough investigation of what synchronisms or sequences there may be between the solar constant as determined, and various weather elements, especially temperature (*Bull. Amer. Meteorol. Soc.*, June, 1920, Vol. I, p. 62).

CHARLES F. BROOKS

GEOGRAPHICAL NEWS

Change in Scope and Title of *The Plant World*. The publishers of *The Plant World* announce a change of title to *Ecology*, beginning with the January number, 1920, which becomes Volume I, Number 1, of the new publication. A foreword by Barrington Moore, President of the Ecological Society of America, outlines the scope of ecology. There is a reference to geography as human ecology and the first number contains a paper by Ellsworth Huntington, entitled "The Control of Pneumonia and Influenza by the Weather." There is also a continuation of A. E. Douglass's studies on the growth rings of trees in a paper entitled, "Evidence of Climatic Effects in the Annual Rings of Trees." The principal conclusions of this paper show a very marked advance in the complicated studies of the meaning of rings of growth in terms of climatic factors (see also the review of "Climatic Cycles and Tree-growth on p. 195 of this *Review*"). On account of their importance and the possibilities of extending Douglass's methods in widely separate areas of the world, the conclusions are here quoted in full.

- "1. Trees probably integrate, and may be made to disclose to us, climatic combinations advantageous to certain types of vegetation.
2. The study of this subject promises to enable us to outline what might be called agrometeorological districts, that is areas over which exist similar advantageous combinations of weather elements.
3. The application of the criterion of mean sensitivity promises to make possible the proper selection of sequoia records, which in turn will give much climatic information about the last 3,200 years.
4. Information regarding suitable forests for similar study, located in central and other parts of North America, will be greatly appreciated by the writer."